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EXAMINER

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2814

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED OFFICE ACTION

1. At the outset Examiner notes that no claim was indicated allowed in the 4/16/2009 Office Action, contrary to the comment in the 9/16/2009 Reply.

Objections to the Specification

2. The specification is objected to under 37 CFR § 1.75(d)(1) for failing to provide clear support or antecedent basis for terms and phrases in claims 10-29.

The detailed description of an application must provide clear support or antecedent basis to terms and phrases in the claims in a manner making ascertainable, by reference to the description, the meaning of terms in the claims. See 37 CFR § 1.75(d)(1) and M.P.E.P. § 608.01(o).

The detailed description of this application however provides neither clear support nor clear antecedent basis for the following terms in the claims:

- a. "at least one first elongated electrical conductor extending in a first direction located on a surface of the first substrate facing the second substrate, at least one second elongated electrical conductor extending in a second direction located on a surface of the second substrate facing the first substrate;" as recited in claim 10, which is further modified by "wherein the second direction is the same as the first direction," as recited in claim 11.
- b. "a first plurality of elongated electrical conductors extending in a first direction ..., a second plurality of elongated electrical conductors extending in a second direction ...," as recited in claim 20, which is further modified by "wherein the second direction is the same as the first direction," as recited in claim 21.

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Presenting claims 10 and 11, and 20 and 21 makes clear, by the Doctrine of Claim Differentiation, that the Reply intends for claims 10 and 20 to have a scope for the disclosed invention wherein the first and second directions are not the same.

The specification as originally filed however describes an invention wherein the first and second directions are the same but fails to allude, let alone describe, any invention wherein the directions are not the same.

Correction is required.

The amended detailed description must provide clear support or antecedent basis to the above terms in a manner making ascertainable, by reference to the description, the meaning of terms in the claims. See 37 CFR § 1.75(d)(1) and M.P.E.P. § 608.01(o).

35 U.S.C. § 132(a) prohibits any "amendment [from] introduc[ing] new matter into the disclosure of the invention." Accordingly, new matter should not be introduced by either addition or deletion.

35 U.S.C. § 112 Rejections of the Claims

3. The following is a quotation of the first paragraph of 35 U.S.C. § 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 10-29 are rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement. The claim(s) contains subject matter not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that Applicant, at the time the application was filed, had possession of the claimed invention.

See above the objection to the specification with respect to claims 10-29.

Correction is required.

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35 U.S.C. § 112, first paragraph, requires the originally filed specification to contain a written description of the claimed invention. And 35 U.S.C. § 132(a) prohibits any "amendment [from] introduc[ing] new matter into the disclosure of the invention." Accordingly, new matter should not be introduced by either addition or deletion.

35 U.S.C. § 102 Rejections of the Claims

5. The text of the appropriate paragraph(s) of 35 U.S.C. § 102, providing the legal basis for the anticipation rejection(s) in this Office Action, can be found in a previous Office Action.

6. Claims 10-29 are rejected under 35 U.S.C. § 102(b) as being anticipated by Patent Document WO2004094956 for a patent application by "Michalewicz-1," also published as PGPUB US 2006/0285789 for a patent application by "Michalewicz-2."

The claims as presented now recite a scope generic to that disclosed by Michalewicz-2. Specifically, scope of pending claims 10 and 20 now generically include the first and second directions not being the same, as well as being the same. Whereas the original specification disclosed the directions of the first and second elongated conductors only being the same. See, for example, FIG. 1 of the PGPUB corresponding to this application.

Patent law precedents hold that a parent patent application disclosing a species but not a genus, and published more than a year from the filing of a child patent application disclosing a genus, renders unpatentable claims directed to the genus in the child patent application as being anticipated by the parent patent application. See, for example, *Tronzo v. Biomet*, 47 USPQ2d 1829 (Fed. Cir. 1998), and *ICU Medical v. Alaris Medical* (2008-1077; Fed. Cir., decided 3/2009).

Claims 10-29 therefore are anticipated by Michalewicz-1, which is the publication of the PCT application, parent to this application including the now presented claims, which lack support in the specification.

35 U.S.C. § 103 Rejections of the Claims

7. The following is a quotation of 35 U.S.C. § 103(a), the basis for the obviousness rejections in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section § 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 10-15, 18, and 19, are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. No. 5,461,916 to "Fujii" in view of 6,137,206 to "Hill" and 5,905,202 to "Kubena."

With respect to claim 10, Fujii discloses a first substrate (substrate 1, see, the abstract; the material over which vibration electrode 5 rests), a second substrate (cantilever 4) is mounted on the first substrate by a hinge web (the narrow extension leading to the cantilever 4); at least one first elongated electrical conductor (either 57 or 58) in a first direction on the first substrate; at least one second elongated electrical conductor (either 59 or 60) in a first direction on the second substrate; wherein the first and second conductors are opposed to each other at a distance; and wherein the hinge allows linear motion of the second substrate with respect to the first substrate in a direction perpendicular to the second direction.

Fujii appears to fail to explicitly disclose using a pair of hinges to mount the second substrate onto the first substrate.

The MEMs art however well recognize arranging two substrates in this manner. See, for example, Hill, the front page. To allow the rotary motion of the second substrate with respect to the first substrate, therefore, it would have been obvious at the time of the invention of this application to one of ordinary skill in the art to have used at least a pair of hinges.

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The recitation "permitting a detectable ..." is considered and determined to be intended use function language failing to further structurally limit claim 10.

Language that suggests or makes optional but does not require steps to be performed, or language that suggests or makes optional but does not limit a claim to a particular structure, does not limit the scope of a claim or claim limitation. See, for example, M.P.E.P § 2106IIC.

Accordingly, absent claiming how functional effects, or affects, are achieved by structural limitations, a functional recitation is determined to be intended-use language (or intended-outcome) not distinguishing scope of an apparatus claim over a prior art apparatus capable of performing the intended-use (or capable of achieving the intended-outcome) language. See, for example, M.P.E.P § 2114 and the precedents cited therein.

The structure Fujii discloses anticipates the structural features recited in the claims and therefore is capable of quantum tunneling when a suitable electrical potential is applied, as recited in the claim. Kubena is presented as evidence that similar structures result in quantum tunneling when a suitable potential is applied. See, for example, the front page.

With respect to claim 11, the second direction is the same direction as the first direction.

With respect to claim 12, the hinge disclosed by Fujii is resilient and has dimensions resulting in stiffness in the second direction lower than the stiffness in a direction perpendicular to the hinge, simply by way of the hinge cross section, which is the as that disclosed by this application.

With respect to claims 13 and 14, the recited pillar reads on the structure connected to the hinge web holding the cantilever 4 with respect to the base of the device in Fujii. And the hinge webs would be in mutual co-planar alignment.

With respect to claim 15, see, for example, FIG. 1, showing the first substrate having a larger area than the second substrate.

With respect to claim 18 and 19, see, for example, Kubena column 4, lines 15-32. dimensions less than 5 nm therefore are art recognizes suitable distances to allow for tunneling current. And according to well established patent law precedents (see, for example, M.P.E.P. §

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2144.07), therefore, it would have been obvious at the time of the invention of this application to one of ordinary skill in the art to have to have used a gap between the first and second substrates of less than 5 nm for its art recognized suitability to allow the initiation of tunneling current.

9. Claim 16 is rejected under 35 U.S.C. § 103(a) as being unpatentable over "Fujii" in view of "Hill" and "Kubena," further in view of U.S. Pat. No. 5,977,596 to "Rountree."

The combination of Fujii, Hill, and Kubena appears to fail to explicitly disclose the elongated conductors comprising elongated doped regions.

Rountree however is evidence that using doped regions in semiconductors as the conducting regions is a suitable practice. See, for example the front page Fig., column 3, lines 20-28, and claim 8. And according to well established patent law precedents (see, for example, M.P.E.P. § 2144.07), therefore, it would have been obvious at the time of the invention of this application to one of ordinary skill in the art to have to have used doped elongated regions as the elongated conductors for their art recognized suitability in providing conducting regions.

10. Claim 17 is rejected under 35 U.S.C. § 103(a) as being unpatentable over "Fujii" in view of "Hill" and "Kubena," further in view of PGPUB US 2003/0036244 for a patent application by "Jones."

The combination of Fujii, Hill, and Kubena appears to fail to explicitly disclose the elongated conductors comprising metal rails.

Jones however is evidence that metal rails are appropriate elongated conductors. See, for example, the front page and paragraph [0048], describing the use of inter-digitated capacitors and their benefits. And according to well established patent law precedents (see, for example, M.P.E.P. § 2144.07), therefore, it would have been obvious at the time of the invention of this application to one of ordinary skill in the art to have to have used metal rails as forming a part of the elongated conductors to increase the capacitive effect, which enhances the charge buildup in the conductive regions, which enhances the tunneling effect.

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11. Claims 20-23, 25, and 27-29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over "Fujii" in view of Kubena and PGPUB US 2003/0036244 for a patent application by "Jones."

With respect to claims 20 and 25, Fujii discloses a first substrate (substrate 1, see, the abstract; the material over which vibration electrode 5 rests), a second substrate (cantilever 4) is mounted on the first substrate by a hinge web (the narrow extension leading to the cantilever 4); at least one first elongated electrical conductor (either 57 or 58) in a first direction on the first substrate; at least one second elongated electrical conductor (either 59 or 60) in a first direction on the second substrate; wherein the first and second conductors are opposed to each other at a distance; and wherein the hinge allows linear motion of the second substrate with respect to the first substrate in a direction perpendicular to the second direction.

Fujii appears to fail to explicitly disclose using a pair of hinges to mount the second substrate onto the first substrate.

The recitation "permitting a detectable ..." is considered and determined to be intended use function language failing to further structurally limit claim 10.

Language that suggests or makes optional but does not require steps to be performed, or language that suggests or makes optional but does not limit a claim to a particular structure, does not limit the scope of a claim or claim limitation. See, for example, M.P.E.P § 2106IIC.

Accordingly, absent claiming how functional effects, or affects, are achieved by structural limitations, a functional recitation is determined to be intended-use language (or intended-outcome) not distinguishing scope of an apparatus claim over a prior art apparatus capable of performing the intended-use (or capable of achieving the intended-outcome) language. See, for example, M.P.E.P § 2114 and the precedents cited therein.

The structure Fujii discloses anticipates the structural features recited in the claims and therefore is capable of quantum tunneling when a suitable electrical potential is applied, as recited in the claim. Kubena is presented as evidence that similar structures result in quantum tunneling when a suitable potential is applied. See, for example, the front page.

Fujii appears to fail to explicitly disclose using plural first and second elongated conductors.

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Jones however discloses and motivates using plural elongated conductors to enhance the capacitive effect by obtaining inter-digitated capacitors.

See, for example, the front page and paragraph [0048], describing the use of inter-digitated capacitors and their benefits. And according to well established patent law precedents (see, for example, M.P.E.P. § 2144.07), therefore, it would have been obvious at the time of the invention of this application to one of ordinary skill in the art to have to have used metal rails as forming a part of the elongated conductors to increase the capacitive effect, which enhances the charge buildup in the conductive regions, which enhances the tunneling effect.

With respect to claim 21, the second direction is the same direction as the first direction.

With respect to claim 22, the recited pillar reads on the structure connected to the hinge web holding the cantilever 4 with respect to the base (substrate 1) of the device in Fujii.

With respect to claim 23, see, for example, FIG. 1, showing the first substrate having a larger area than the second substrate.

With respect to claim 27, the second substrate (cantilever 4) has at least the vibrational motion which is perpendicular to the plane of the second substrate. See, for example, the front page of Fujii.

With respect to claim 28 and 29, see, for example, Kubena column 4, lines 15-32. Dimensions less than 5 nm therefore are art recognizes suitable distances to allow for tunneling current. And according to well established patent law precedents (see, for example, M.P.E.P. § 2144.07), therefore, it would have been obvious at the time of the invention of this application to one of ordinary skill in the art to have to have used a gap between the first and second substrates of less than 5 nm for its art recognized suitability to allow the initiation of tunneling current.

12. Claim 24 is rejected under 35 U.S.C. § 103(a) as being unpatentable over "Fujii" in view of "Jones" and "Kubena," further in view of "Rountree."

The combination of Fujii, Jones, and Kubena appears to fail to explicitly disclose the elongated conductors comprising elongated doped regions.

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Rountree however is evidence that using doped regions in semiconductors as the conducting regions is a suitable practice. See, for example, the front page Fig., column 3, lines 20-28, and claim 8. And according to well established patent law precedents (see, for example, M.P.E.P. § 2144.07), therefore, it would have been obvious at the time of the invention of this application to one of ordinary skill in the art to have used doped elongated regions as the elongated conductors for their art recognized suitability in providing conducting regions.

13. Claim 26 is rejected under 35 U.S.C. § 103(a) as being unpatentable over "Fujii" in view of "Jones" and "Kubena," further in view of "Hill."

The combination of Fujii, Jones, and Kubena appears to fail to explicitly disclose using three more solid state hinges to mount the second substrate onto the first substrate.

The MEMS art however well recognize arranging two substrates in this manner. See, for example, Hill, the front page. To allow the rotary motion of the second substrate with respect to the first substrate, therefore, it would have been obvious at the time of the invention of this application to one of ordinary skill in the art to have used at least three more hinge structures.

Response to Applicant's Argument(s)

14. The arguments in the 9/16/2009 Reply have been fully considered. These arguments however are not found persuasive.

With respect to claim 10, the Reply argues that the applied prior art (Frazier) fails to recite the at least one pair of solid state hinges.

In response, Examiner notes that combination of Fujii and Hill discloses at least four hinges to allow rotary motion.

With respect to claim 20, the Reply argues that the applied prior art (Frazier) fails to recite at least two pluralities of elongated conductors.

In response, Examiner notes that the combination of Fujii and Jones discloses at least two pluralities of elongated conductors.

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Additional Prior Art of Record

15. U.S. Pat. Nos. 6,707,308 to "Michalewics-3" discloses how to use measure quantum tunneling current between elongated conductors, which are of nanometer dimensions, when they are moved rotationally or vibrationally.

CONCLUSION

16. **THIS OFFICE ACTION IS MADE FINAL.**

A shortened statutory period for reply to this Office Action is set to expire **THREE MONTHS** from the mailing date of this Office Action. Applicant is reminded of the extension of time policy as set forth in 37 CFR § 1.136(a).

If a first reply is filed within TWO MONTHS of the mailing date of this Office Action and the advisory Office Action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory Office Action is mailed, and any extension fee pursuant to 37 CFR § 1.136(a) will be calculated from the mailing date of the advisory Office Action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this Office Action.

Any inquiry concerning this communication or earlier communications from an Examiner should be directed to Examiner Hrayr A. Sayadian, at (571) 272-7779, on Monday through Friday, 7:30 am – 4:00 pm ET.

If attempts to reach Mr. Sayadian by telephone are unsuccessful, his supervisor, Supervisory Primary Examiner Wael Fahmy, can be reached at (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available only through Private PAIR.

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/HAS/

/Wael M Fahmy/

Supervisory Patent Examiner, Art Unit 2814